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Amendment to Claims - Single Walled Insulating Vacuum Envelope (SWIVE)

[c1] "amended"

A vacuum filled structural frame, enclosing perishable materials or materials with melting points between 50 and 150 degrees Fahrenheit, that are to be stored or shipped without isolation from the vacuum, supporting an external pliable covering, for maintaining said inside materials and said external pliable covering in spaced apart relationship for the purpose of insulating said inside materials from thermal conduction.

[c7] "amended"

The vacuum filled structural frame of Claim 2 wherein said structural frame is capable of supporting the external pliable covering under the external pressure of the atmosphere completely, if the interior said perishable or heat deformable material is packed loosely, so that none of the force being imparted by the external pressure of the atmosphere on the external pliable covering is transferred through the physical supports of the said vacuum filled structural frame towards the material being stored or shipped in the interior.

[c8]

"Claim 8 is cancelled by this instruction"

[c10]

"Claim 10 is cancelled by this instruction"

[c11]

"Claim 11 is cancelled by this instruction"

[c12]

"Claim 12 is cancelled by this instruction"

[c13]

"Claim 13 is cancelled by this instruction"

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[c1] "amended"

A vacuum filled structural frame, enclosing perishable materials or materials with melting points between 50 and 150 degrees Fahrenheit, that are to be stored or shipped without isolation from the vacuum, supporting an external pliable covering, for maintaining said inside materials and said external pliable covering in spaced apart relationship for the purpose of insulating said inside materials from thermal conduction.

[c7] "amended"

The vacuum filled structural frame of Claim 2 wherein said structural frame is capable of supporting the external pliable covering under [vacuum] the external pressure of the atmosphere completely, if the interior said perishable materials or materials with melting points between 50 and 150 degrees Fahrenheit material are packed loosely, so that none of the force being imparted by the [vacuum] external pressure of the atmosphere on the external pliable covering is transferred through the physical supports of the said vacuum filled structural frame towards the material being stored or shipped in the interior.

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Amendment to Paragraphs - Single Walled Insulating Vacuum Envelope (SWIVE)

[0016] "replace"

FIG. 1 is an exploded perspective of the major elements of a single walled insulating vacuum envelope.

[0017] "delete"

[0018] "replace"

FIG. 2 is a perspective of a grid of pyramidal frames.

[0019] "replace"

FIG. 3 is a perspective of a grid of pyramidal frames that have been bent to fit around a box.

[0020] "delete"

[0021] "replace"

Referring now to the drawings wherein like parts are indicated by like numerals, the numeral 15 indicates a pliable external covering made of a single layer or a laminated film of any suitable plastic or composite plastic material, although any pliable material capable of holding a vacuum sufficiently could conceivably be used. The pliable envelope 15, which it is to be understood completely envelopes the interior pieces 10 - 13, is vacuum filled and subsequently sealed.

[0022] "replace"

In particular, a pliable envelope comprised of a composite of metallic foil and plastic film would serve to decrease the permeability of the external pliable envelope 15, thereby holding a stronger vacuum for a longer period of time, and additionally serving to reflect away a certain percentage of any electromagnetic radiation present that is capable of transmission through a vacuum, such as infrared.

[0023] "replace"

It is to be understood, that although any number of means could conceivably be used to seal a vacuum filled pliable envelope, a standard heat sealed strip 14 as created by any number of currently available devices is indicated.

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[0024] "replace"

The top piece 10 and the bottom piece 13 of the interior frame are identical pieces, one turned 180 degrees around one axis in relation to the other. Furthermore, stacking pieces 11 and 12 are also identical pieces, stacking piece 12 being indicated solely in order to demonstrate the manner in which the modular interior pieces stack one on top of the other.

[0025] "replace"

Perforations 16 in the identical top and bottom pieces serve a dual function, allowing unobstructed removal of the interior gasses during the vacuum filling process and additionally minimizing the surface contact area between the pliable envelope 15 and the interior construction interior pieces 10 - 13. Although the perforations 16 shown are rectangular, it is understood that perforations of any geometric shape could be used, including round or triangular.

[0026] "replace"

A structural platform 17 surrounding the perforations 16 provides an additional structural support to guard against buckling or bowing of the top piece 10 or bottom piece 13 under the significant pressure created by vacuum filling the pliable envelope 15. The under side of the outer rim 18 creates a platform upon which the underside of the structural wall 26 rests when used with the bottom piece 13.

[0027] "replace"

A structural platform 19 serves the dual purpose of not only providing a structural support upon which to place the minimized thermal isolation points 20, but also provides considerable structural support against buckling or bowing to the interior modular pieces 11 - 12.

[0028] "replace"

The top face of the intermediate step 24 serves as a platform against which the protruding rim 21 rests, and the protruding rim 23 fits within the protruding rim 21, when used with the top piece 10.

[0029] "replace"

Perforations in the structural wall 26 additionally minimize surface contact area between the pliable envelope 15 and the interior construction 10 - 13. Although the perforations shown in the structural wall 26 are rectangular, it is understood that perforations of any geometric shape could be used, including round or triangular. The perforations shown in the structural wall 26 are optional, serving only as a secondary means of reducing the possible paths for heat conduction and could be eliminated altogether.

[0030] "replace"

Although the minimized thermal isolation points **20** are shown as being pyramidal in shape, it is explicitly understood that many conceivable shapes could be used for this purpose, specifically rods or rectangles, although since these points represent the primary path for heat conduction to the interior material being stored or shipped, the design would suffer given additional surface area in contact, albeit that that might be acceptable, or even required, for particular materials. Furthermore, although the minimized thermal isolation points **20** are shown extending to sharp points, the tips could be rounded with little loss in performance, microscopically this is what must occur in any case. It is also understood that both the number of minimized thermal isolation points **20** and their precise locations could vary greatly from the configuration currently shown.

[0031] "replace"

Additionally, there are minimized thermal isolation points **22** connected to the top piece **10** and the bottom piece **13**. Although the minimized thermal isolation points **22** are shown as being formed of dual perpendicular pyramids it is understood that many conceivable shapes could be used for this purpose, specifically rods or rectangles. It is also understood that both the number of minimized thermal isolation points **22** and their precise locations could vary greatly from the configuration currently shown.

[0032] "replace"

The underside of structural wall **26**, although by itself relatively un-reinforced through the proximity of additional supporting structures, in all cases transfers the force imparted upon it to the structural support of an adjoining piece via a protruding rim **21** when attached to a connecting modular interior pieces **11 - 12** or through the protruding rim **24** when attached to a bottom piece **13**. Of course, this imparts a great deal of structural strength to the interior frame.

[0033] "replace"

Although the pressure imparted by the atmosphere on the vacuum filled envelope will serve to hold the pieces firmly together with no need of any additional supports, in order to temporarily hold the pieces together during construction, small indentations and small protrusions can be provided for the convenience of the constructor in order to allow the modular pieces to snap together using a compression fitting as is already commonly known how to do.

[0034] "replace"

Therefore, the perishable material or material with low melting point **25** on the interior of a single walled vacuum envelope, and therefore not isolated from the vacuum, will be substantially protected from thermal conduction through the use of the vacuum space and the minimized thermal isolation points **22**.

[0035] "replace"

It is understood that although the modular pieces **10 - 13** are rectangular in cross section, a cross section of any geometric shape capable of being represented on a two dimensional plane could be used, for example triangular, circular or hexagonal.

[0036] "replace"

Furthermore, although it would be theoretically possible to form the construction shown by **10 - 13** from one piece and have the design suffer no differences whatsoever, as opposed to using modular pieces, for all practical purposes, the modular form is likely required when using modern plastic molding techniques to form the parts. Modular pieces as well provide an easy way to form the correct length.

[0037] "replace"

An alternate method of constructing a frame suitable of supporting a pliable envelope under vacuum pressure while minimizing the surface area of physical contact between said frame and the material being shipped or stored inside the vacuum, for the purpose of efficiently minimizing possible pathways for thermal conduction, is shown in FIG. **2**. Because the material being shipped or stored using this said alternate method must necessarily serve as an integral part of the structural support, given a lightweight structural frame, this said alternate method is only suitable for materials that can withstand the pressure being exerted by a pliable envelope under vacuum pressure, such as most materials can withstand when stored within a suitable container, such as a plastic wrapped candy box.

[0038] "replace"

A grid of interconnected pyramidal frames as shown in FIG. **2** is constructed such that the said interconnected pyramidal frames attach to each other at all four sides of their square pyramid base **29**, to the extent that the grid continues. A minimized thermal isolation point **27** is naturally created at the top most point of each pyramidal frame.

[0039] "replace"

Each said interconnected pyramidal frame is constructed of a sufficiently ductile plastic and interconnected along each side of each square pyramid base **29** by a thin section of said ductile plastic in such a way that a natural hinge **30** is created along each side of each interconnected pyramidal base, to the extent that the grid continues.

[0040] "replace"

The upright member of each pyramidal frame **28** extends upwards at an angle of 35.26438967 degrees from each corner of the square pyramid base **29** towards the pyramid's top most point, this said angle, when viewed from the side, will then form an angle of 45 degrees, allowing the interconnected pyramidal pieces to form 90 degree angles when bent along their ductile plastic hinges **30** so that the upright members of the pyramidal frames **28** meet.

[0041] "replace"

The construction pictured in FIG. **3** can easily be made by taking a piece of grid as depicted by FIG. **2** that is ten by seven pyramidal frames in extent. If the pyramidal frames are numbered so that each row is numbered one to ten and each column is numbered one to seven, rows listed before columns, then the construction shown in FIG. **3** can easily be formed by clipping out and discarding the following pyramidal frames (1,1) (5,1) (6,1) (10,1) (1,7) (5,7) (6,7) (10,7) and then bending the construction in order to form 90 degree angles between rows 1,2 rows 4,5 rows 6,7 and rows 9,10 and between columns 1,2 and 6,7 at which time the construction will be complete exactly as shown in FIG. **3**.

[0042] "replace"

It is noteworthy to comment that the construction shown in FIG. **3** continues to contact the box **32** that is shown situated inside the exterior framework **33** by only pin like points **31** with minimal surface area contact maintained.

[0043] "replace"

A clip could be used to hold the unsupported side edges or corner edges of the construction shown in FIG. **3** temporarily together for the convenience of the constructor. Although alternately, the pliable vacuum filled envelope would serve to pull the pieces into place in any case, with or without the use of a temporary clip.

[0016] "replace"

[FIGS. 1A - 1E] FIG. 1 [are] is an exploded perspective of the major elements of a single walled insulating vacuum envelope.

[0018] "replace"

FIG. [3] 2 is a perspective of a [gird] grid of pyramidal frames.

[0019] "replace"

FIG. [4] 3 is a perspective of a grid of pyramidal frames that have been bent to fit around a box.

[0021] "replace"

Referring now to the drawings wherein like parts are indicated by like numerals, the numeral [2] 15 indicates a pliable external covering made of a single layer or a laminated film of any suitable plastic or composite plastic material, although any pliable material capable of holding a vacuum sufficiently could conceivably be used. The pliable envelope [2] 15, which it is to be understood completely envelopes the interior pieces [FIGS. 1B - 1E] 10 - 13, is vacuum filled and subsequently sealed.

[0022] "replace"

In particular, a pliable envelope comprised of a composite of metallic foil and plastic film would serve to decrease the permeability of the external pliable envelope [2] 15 , thereby holding a stronger vacuum for a longer period of time, and additionally serving to reflect away a certain percentage of any electromagnetic radiation present that is capable of transmission through a vacuum, such as infrared.

[0023] "replace"

It is to be understood, that although any number of means could conceivably be used to seal a vacuum filled pliable envelope, a standard heat sealed strip [1] 14 as created by any number of currently available devices is indicated.

[0024] "replace"

The top piece [FIG. 1B] 10 and the bottom piece [FIG. 1E] 13 of the interior frame are identical pieces, one turned 180 degrees around one axis in relation to the other. Furthermore, [FIG. 1C and FIG. 1D] stacking pieces 11 and 12 are also identical pieces, [FIG. 1D] stacking piece 12 being indicated solely in order to demonstrate the manner in which the modular interior pieces stack one on top of the other.

[0025] "replace"

Perforations [3] 16 in the identical top and bottom pieces serve a dual function, allowing unobstructed removal of the interior gasses during the vacuum filling process and additionally minimizing the surface contact area between the pliable envelope [2] 15 and the interior [construction FIGS. 1B - 1E] pieces 10 - 13. Although the perforations [3] 16 shown are rectangular, it is understood that perforations of any geometric shape could be used, including round or triangular.

[0026] "replace"

A structural platform [4] 17 surrounding the perforations [3] 16 provides an additional structural support to guard against buckling or bowing of the top [FIG. 1B] piece 10 or bottom piece [FIG. 1E] 13 under the significant pressure created by vacuum filling the pliable envelope [2] 15. The under side of the outer rim [5] 18 creates a platform upon which the underside of the structural wall [9] 26 rests when used with the bottom piece [FIG. 1E] 13.

[0027] "replace"

A structural platform [6] 19 serves the dual purpose of not only providing a structural support upon which to place the minimized thermal isolation points [7] 20, but also provides considerable structural support against buckling or bowing to the interior modular pieces [FIGS. 1C - 1D] 11 - 12.

[0028] "replace"

The top face of the intermediate step [14] 24 serves as a platform against which the protruding rim [8] 21 rests, and the protruding rim [13] 23 fits within the protruding rim [8] 21, when used with the top piece [FIG. 1B] 10.

[0029] "replace"

Perforations in the structural wall [9] 26 additionally minimize surface contact area between the pliable envelope [2] 15 and the interior construction [FIGS. 1B - 1E] 10 - 13. Although the perforations shown in the structural wall [9] 26 are rectangular, it is understood that perforations of any geometric shape could be used, including round or triangular. The perforations shown in the structural wall [9] 26 are optional, serving only as a secondary means of reducing the possible paths for heat conduction and could be eliminated altogether [as shown in FIG. 2B].

[0030] "replace"

Although the minimized thermal isolation points [7] 20 are shown as being pyramidal in shape, it is explicitly understood that many conceivable shapes could be used for this purpose, specifically rods or rectangles, although since these points represent the primary path for heat conduction to the interior material being stored or shipped, the design would suffer given additional surface area in contact, albeit that that might be acceptable, or even required, for particular materials. Furthermore, although the minimized thermal isolation points [7] 20 are shown extending to sharp points, the tips could be rounded with little loss in performance, microscopically this is what must occur in any case. It is also understood that both the number of minimized thermal isolation points [7] 20 and their precise locations could vary greatly from the configuration currently shown.

[0031] "replace"

Additionally, there are minimized thermal isolation points [12] 22 connected to the top piece [FIG. 1B] 10 and the bottom piece [FIG. 1E] 13. Although the minimized thermal isolation points [12] 22 are shown as being formed of dual perpendicular pyramids it is understood that many conceivable shapes could be used for this purpose, specifically rods or rectangles. It is also understood that both the number of minimized thermal isolation points [12] 22 and their precise locations could vary greatly from the configuration currently shown.

[0032] "replace"

The underside of structural wall [9] 26, although by itself relatively un-reinforced through the proximity of additional supporting structures, in all cases transfers the force imparted upon it to the structural support of an adjoining piece via a protruding rim [8] 21 when attached to a connecting modular interior [piece FIGS. 1C - 1D] pieces 11 - 12 or through the protruding rim [14] 24 when attached to a bottom piece [FIG. 1E] 13. Of course, this imparts a great deal of structural strength to the interior frame.

[0033] "replace"

Although the pressure imparted by the atmosphere on the vacuum filled envelope will serve to hold the pieces firmly together with no need of any additional supports, in order to temporarily hold the pieces together during construction, small indentations [10] and small protrusions [11 are] can be provided for the convenience of the constructor in order to allow the modular pieces to snap together using a compression fitting as is already commonly known how to do.

[0034] "replace"

[It is understood that although the modular pieces shown in FIGS. 1B - 1E are rectangular in cross section, a cross section of any geometric shape capable of being represented on a two dimensional plane could be used, for example triangular, circular or hexagonal.] Therefore, the perishable material or material with low melting point 25 on the interior of a single walled vacuum envelope, and therefore not isolated from the vacuum, will be substantially protected from thermal conduction through the use of the vacuum space and the minimized thermal isolation points 22.

[0035] "replace"

[FIGS. 2A - 2C represent an alternative configuration of FIGS. 1B - 1E that is identical in every way except that it has been constructed of modular pieces that are circular in cross section rather than rectangular.] It is understood that although the modular pieces 10 - 13 are rectangular in cross section, a cross section of any geometric shape capable of being represented on a two dimensional plane could be used, for example triangular, circular or hexagonal.

[0036] "replace"

Furthermore, although it would be theoretically possible to form the constructions shown [in FIGS. 1B - 1E and FIGS. 2A - 2C] by 10 - 13 from one piece and have the design suffer no differences whatsoever, as opposed to using modular pieces, for all practical purposes, the modular form is likely required when using modern plastic molding techniques to form the parts. Modular pieces as well provide an easy way to form the correct length.

[0037] "replace"

An alternate method of constructing a frame suitable of supporting a pliable envelope under vacuum pressure while minimizing the surface area of physical contact between said frame and the material being shipped or stored inside the vacuum, for the purpose of efficiently minimizing possible pathways for thermal conduction, is shown in FIG. [3] 2. Because the material being shipped or stored using this said alternate method must necessarily serve as an integral part of the structural support, given a lightweight structural frame, this said alternate method is only suitable for materials that can withstand the pressure being exerted by a pliable envelope under vacuum pressure, such as most materials can withstand when stored within a suitable container, such as a plastic wrapped candy box.

[0038] "replace"

A grid of interconnected pyramidal frames as shown in FIG. [3] 2 is constructed such that the said interconnected pyramidal frames attach to each other at all four sides of their square pyramid base [17] 29, to the extent that the grid continues. A minimized thermal isolation point [15] 27 is naturally created at the top most point of each pyramidal frame.

[0039] "replace"

Each said interconnected pyramidal frame is constructed of a sufficiently ductile plastic and interconnected along each side of each square pyramid base [17] 29 by a thin section of said ductile plastic in such a way that a natural hinge [18] 30 is created along each side of each interconnected pyramidal base, to the extent that the grid continues.

[0040] "replace"

The upright member of each pyramidal frame [16] 28 extends upwards at an angle of 35.26438967 degrees from each corner of the square pyramid base [17] 29 towards the pyramid's top most point, this said angle, when viewed from the side, will then form an angle of 45 degrees, allowing the interconnected pyramidal pieces to form 90 degree angles when bent along their ductile plastic hinges [18] 30 so that the upright members of the pyramidal frames [16] 28 meet.

[0041] "replace"

The construction pictured in FIG. [4] 3 can easily be made by taking a piece of grid as depicted by FIG. [3] 2 that is ten by seven pyramidal frames in extent. If the pyramidal frames are numbered so that each row is numbered one to ten and each column is numbered one to seven, rows listed before columns, then the construction shown in FIG. [4] 3 can easily be formed by clipping out and discarding the following pyramidal frames (1,1) (5,1) (6,1) (10,1) (1,7) (5,7) (6,7) (10,7) and then bending the construction in order to form 90 degree angles between rows 1,2 rows 4,5 rows 6,7 and rows 9,10 and between columns 1,2 and 6,7 at which time the construction will be complete exactly as shown in FIG. [4] 3.

[0042] "replace"

It is noteworthy to comment that the construction shown in FIG. [4] 3 continues to contact the box [20] 32 that is shown situated inside the exterior framework [21] 33 by only pin like points [19] 31 with minimal surface area contact maintained.

[0043] "replace"

A [four legged] clip [formed of two perpendicularly interconnected truncated elliptical or circular frames FIG. 5, said legs of which are any geometric shape including circular, rectangular, triangular or elliptical in cross section can] could be used to hold the unsupported side edges or corner edges of the construction shown in FIG. [4] 3 temporarily together for the convenience of the constructor. Although alternately, the pliable vacuum filled envelope would serve to pull the pieces into place in any case, with or without the use of [the four legged clips FIG. 5] a temporary clip.

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FIG. 4 and FIG. 5 have been deleted.